

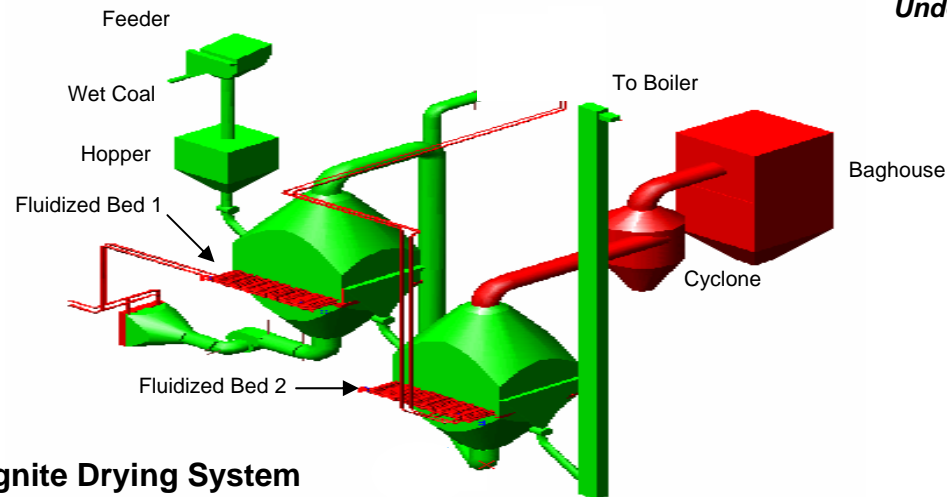
Great River Energy

- Lignite Fuel Enhancement - applicable to power plants burning inherently high-moisture coals.
- Achieving higher plant efficiencies, lower operating costs, and lower emissions.
- Total Project funding:
\$28 million (DOE share: \$11 million).



*546 MWe Coal Creek Station
Underwood, ND*

Two-Stage Fluidized Bed Dryer System using Waste Heat



Lignite Drying System

A CCPI Round 1 Project



Background

- **Great River Energy will demonstrate an approach to reduce moisture of lignite coal from 40% to 30% by using waste heat at Coal Creek Station.**
- **Project Location: Great River Energy's Coal Creek Station, Underwood, ND.**
- **Team members include:**
 - EPRI (Palo Alto, CA)
 - Lehigh University (Bethlehem, PA)
 - Barr Engineering (Minneapolis, MN)
 - Falkirk Mining and Couteau Properties (Underwood, ND)



– **Background**

- **A phased implementation is planned.**
 - Full-scale (91 MW) prototype lignite dryer to be developed for one pulverizer.
 - Then full-scale, long-term testing on complete set of dryers needed for full-power operation of one 546 MW unit at Coal Creek Station.
- **Effect of incremental drying on plant performance and optimum operating conditions will be studied.**



Technology Uniqueness

- **Uses waste heat from power plant condenser to increase heating value of lignite or sub-bituminous coals by partial drying.**
- **Achieves a significant improvement (2.8% - 5.0%) in plant performance by removing about 25% of fuel moisture before it is converted to steam using high-value heat.**
- **Reduces emissions of SO₂ by 25% and emissions of NO_x, Hg, CO₂ and ash by 7% from low rank coal-fired power plants by requiring less coal feed to produce same amount of electricity.**
- **Drying process might also be modified to remove and capture mercury.**



Schedule

- **Project Starts**
 - April 2004
- **NEPA Process**
 - EA, FONSI signed January 16, 2004
- **Design**
 - Single Dryer: April 2004 to Nov. 2004
 - Multiple Dryers: May 2005 to Dec. 2005
- **Construction**
 - Single Dryer: July 2004 – Feb. 2005
 - Multiple Dryers: Oct. 2005 – April 2007
- **Operation**
 - Single Dryer: Jan. 2005 – Jan. 2006
 - Multiple Dryers: April 06 to Oct. 2007
- **Project Complete**
 - March 2008



– **Potential Benefits**

- **This technology can increase cost-effectiveness of units burning high-moisture coals.**
 - Plants burning high moisture coals make up more than half of coal generating capacities in U.S.
 - 29 plants burn lignite directly (15.3 GW)
 - 150 plants burn Powder River Basin (PRB) coal (more than 150 GW)
- **Technology application will achieve 2.8% - 5% improvement in plant performance resulting in reduced emissions (25% less SO₂; 7% less Hg, CO₂, NO_x and ash).**



Potential Benefits

- **A significant economic benefit resulting in a total annual savings @ \$0.70 per MWh:**
 - \$3 million for Coal Creek Station
 - \$84 million for all U.S. lignite-fired units
 - \$840 million for all PRB coal-fired units
- **An increased competitive position for lignite-fired power plants.**
- **Lower O&M costs, increased generation capacity, less maintenance, better performance and increased reliability.**
- **Increased value and use of nation's lignite & PRB reserves.**



Benefits Analysis www.NETL.DOE.GOV/coalpower/CCPI/Index.html